

S. HRG. 110–1191

# SCIENCE PARKS: BOLSTERING U.S. COMPETITIVENESS

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## HEARING BEFORE THE SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND INNOVATION OF THE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE ONE HUNDRED TENTH CONGRESS

FIRST SESSION

OCTOBER 18, 2007

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

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## **SCIENCE PARKS: BOLSTERING U.S. COMPETITIVENESS**

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**THURSDAY, OCTOBER 18, 2007**

U.S. SENATE,  
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND INNOVATION,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
*Washington, DC.*

The Subcommittee met, pursuant to notice, at 2:38 p.m. in room SR-253, Russell Senate Office Building, Hon. Mark Pryor, presiding.

### **OPENING STATEMENT OF HON. MARK PRYOR, U.S. SENATOR FROM ARKANSAS**

Senator PRYOR. I want to thank everybody for coming, and I'll go ahead and call the Subcommittee to order.

Let me say that we are about to have a vote here, any minute, in fact it may have just started. And so, what I propose to do, if it's OK with my two colleagues who are here, is allow Senator Bingaman to go first. He's been working on this issue for a long, long time, and deserves a lot of credit for getting us where we are today. Then recognize you, because I know you have some words to say, and by that time, it'll probably be time for us to go vote, and then we'll go from there.

Senator Bingaman?

### **STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO**

Senator BINGAMAN. Thank you very much, Mr. Chairman, and thanks for having this hearing, and for your leadership on this issue.

I first got interested in the whole issue of science parks, I think, in some of the trips that I've taken to Asia. Particularly, I've had the chance to visit the Hsinchu Science city, there in Taiwan. I visited the Science and Technology Parks in Hong Kong, I visited various technology parks and science parks in India, and I'm persuaded that the legislation that you're now promoting, which is very similar to legislation I introduced, is well-designed to put a real focus on the importance of developing these high technology jobs in a sensible way throughout our country.

We've got a lot of potential in this country to remain the world leader in science and technology, but frankly we are doing less as a nation to accomplish that than many of the countries that we're competing with. And I know you and Senator Carper have probably

visited some of these same kinds of science parks in foreign countries that I have, so I won't go into great detail about them.

Let me just talk about some of the specific issues that I think are some of the common features. First, there's a government commitment in each of these countries to provide a first-class infrastructure for science and technology-based companies. That, I think is very important, and of course that's part of your legislation, these parks align companies that have similar interests, that's very important. You can have a critical mass of talent focused on a particular issue, and that helps terrifically.

Third, the government provides, essentially, a one-stop shopping opportunity for government approvals for obtaining loans for doing a variety of the things that are important to these companies.

Fourth, the government provides tax incentives for companies that want to locate in these parks, and pursue these high-tech jobs, the creation of these high-tech jobs, and finally the government takes the long view of the importance of partnering with local governments to develop the workforce that's needed. The workforce, ultimately, is absolutely essential, and a lot of the science parks that I visited have very close working relationships with their local universities to train the people that are needed to work in these industries.

The current legislation, S. 1373 is a shortened version of legislation we proposed in the previous two Congresses. I think it has in it the essential elements of that legislation, and as I say, I congratulate you for that. It has grants for science park planning. That's very important, and it also makes provisions for loan guarantees for construction.

I think those are very essential components. I think it would be a major step forward, and a major signal to U.S. industry if we were to pass this legislation, and get the Federal Government solidly on the side of promoting more development of science and technology parks throughout the country, and by use of that mechanism, more creation of high-tech jobs throughout the country.

So, again, I congratulate you, and I know you've got a distinguished group of witnesses today to talk in more depth about these issues. I thank you for letting me come and speak.

Senator PRYOR. Thank you, Senator Bingaman. I'll tell you, you've shown a lot of great leadership on this over the last several years, and we appreciate it, the Committee does, but also the Senate appreciates your leadership on this good policy and you're right on the money. So, thank you.

Senator Carper?

**STATEMENT OF HON. THOMAS R. CARPER,  
U.S. SENATOR FROM DELEWARE**

Senator CARPER. Thank you, Mr. Chairman.

Mr. Chairman, it's good to have a look at Senator Bingaman from this perspective, and to——

Senator BINGAMAN. Which perspective do you usually look at me from?

[Laughter.]

Senator CARPER. I'm usually following you, so——

Senator BINGAMAN. I see.

Senator CARPER. Nice to be in this spot.

I applaud the effort that he's providing. He provides leadership in so many areas, he's an inspiration to me, and I'm sure to our colleagues as well.

I'm here today to applaud his leadership and that of yours. I always like to talk about my grandfathers. My grandfathers were able to get jobs when they were growing up on the strength of their backs. My children and our children, going forward in the years to come, they'll get fine jobs on the strength of their minds. It's just so important that we keep that in mind as we go forward if we're going to be successful in this new century.

Part of our being competitive as a nation, includes having a workforce that's competitive, where young people coming out of our schools can read, can write, can think, use math, use technology, and have a good work ethic. Part of it includes having the kind of infrastructure that we need to make sure that we have trade policies that make sense in the 21st century, and also to invest in science parks.

We have them in our state, and I know we have them in other places around the country, certainly, in New Mexico, and not far from Fayetteville, Arkansas, we might have one or two down there as well.

But, I'm here today, to introduce, I'm tempted to call him my old friend, but he's not old, but a good friend of mine, and of our state, Michael Bowman. During the time that I was privileged to serve as Delaware's Governor, I made it a priority to include the creation and growth of technology-based companies.

Mike is one of those experts that I turned to as Governor to help our State find ways to create and grow the DuPont companies of the future. Michael worked for many years at the DuPont Company of the past. He was a Vice President of DuPont's Advanced Materials and Systems. That was about a billion dollar business, and with over 2,500 employees.

While at DuPont, Mike played a key role in helping Delaware to develop its strategy for technology-based economic development, including the concept for a new technology park that's now adjacent to the University of Delaware.

Upon his retirement from the company in 1998, Mike took over as Chairman of the Board and CEO of the Delaware Technology Park, and that's a collaboration between the state of Delaware, the University of Delaware, and a number of high-tech companies in our state, including the DuPont Company.

And thanks to Michael's leadership, the Delaware Technology Park has attracted established industries and is providing opportunities and support to start-up companies in high-tech fields, especially those in biotechnology, information technology, and advanced materials.

Just 2 years ago, in 2005, the Delaware Technology Park was recognized as "Outstanding Research Park of the Year," and the park was renamed in Michael's honor. No, I'm kidding about that.

[Laughter.]

Senator CARPER. It should have been, it should have been.

The 40-acre park is home to some 54 companies, it's home to the Delaware Biotechnology Institute, and it's home to about 750 em-

ployees. It's graduated some 20 spin-off companies, he's proud of that, and I am as well. And fortunately my staff was good enough to write a draft of my remarks, that said "it's graduated some 20 spin-out companies" but they're really spin-off companies.

Delaware Technology Park tenants have won approximately \$200 million of Federal grant awards, and have invested about \$150 million in our small State, to date.

The Park and the Delaware Biotech Institute have had a direct role in the creation of some 15,000 jobs. That's a lot of jobs for my little State, and it might even be a lot for Arkansas.

Earlier this year, Mike Bowman was elected to the job that a lot of our colleagues would like to have, and that's President. And I was joking earlier that John McCain—it's often said in past years when asked if he was running for President, he always responded, "In the U.S. Senate, unless you're in detox or under indictment, you're assumed to be running for President."

[Laughter.]

Senator CARPER. Mike Bowman is not a wanna-be, he is President. He's President of the Board of Associations of University Research Parks, which includes about 100 U.S. and Canadian research parks.

Currently, Michael serves as a Board Member of five technology companies, and is also on the Board of First Aid Innovation, the Delaware Science and Technology Council, the University of Delaware Technology Corporation, and he's a member of the National Council on Competitiveness.

He holds a Bachelor of Science Degree in Chemical Engineering from the University of Cincinnati. He went to Cincinnati and later on, added to that, business programs and financial programs at Wharton, and Columbia.

I'm just delighted as a Delawarean and a recovering Governor, that Mike Bowman is here today to provide us with direction on how to support the creation of high-paying, high skill jobs in technology-based companies that will help determine our competitiveness in the future.

Thank you very much for this opportunity.

Welcome, Michael.

Senator PRYOR. Now, for the audience and for the Committee's members, we're going to have to recess. We've got a series of four roll call votes, it'll be at least 30 minutes, maybe more like 45, before we're able to reconvene. We'll take a brief recess, and when we come back, we'll get moving with the hearing. So, the Subcommittee stands in recess.

[Recessed.]

Senator PRYOR. Well, let me reconvene our Subcommittee, and thank all of the witnesses and the audience for their patience. We had that series of votes and, had a lot of business going on down there on the floor. Hopefully some of it will lead to some good things.

Let me also say that, we're going to leave the record open so Senators should feel free to submit questions for the record. We'll leave it open for 2 weeks. As an example, Senator Snowe asked me to put her opening statement in the record, and so I'm honored to do that.

That will be made part of the record and other Senators may do the same.

[The prepared statement of Senator Snowe follows:]

PREPARED STATEMENT OF HON. OLYMPIA J. SNOWE, U.S. SENATOR FROM MAINE

Thank you, Mr. Chairman, for holding this pivotal hearing today on the crucial issue of strengthening America's competitiveness by enhancing U.S.-based science, research, and technology parks. Your invaluable and longstanding leadership on behalf of advancing innovative technology in our economy is confirmed by convening this timely hearing.

We are gathered here today to explore and recognize the value of "science parks"—which are concentrated high-tech, science, and research-related businesses—in strengthening America's global competitiveness. Through the development of new innovative technologies, competing and complementary companies working within close quarters are able to build on each others' ideas when entering the national and global marketplace. Unlike well known industrial parks, science parks focus primarily on innovation and product advancement. *These parks are a vital part of the Nation's economy, creating 2.57 jobs for each core job in a science park.*

As a cosponsor of S. 1373, the "Building a Stronger America Act," I adamantly encourage increased investment in new and existing science, research, and technology parks throughout the U.S. This legislation would drive innovation and regional entrepreneurship by enabling existing science parks to make needed renovations while also encouraging rural and urban states to undertake studies on developing their own successful regional science clusters.

Congress recently passed, and the President signed into law, the "America COMPETES Act," legislation authorizing \$43 billion of new funding over the next three fiscal years which will boost Federal investment in math and science education programs. Continuing the efforts of the "America COMPETES Act" by increasing research funding and education for our innovative workforce is vital, and S. 1373 will ensure that this workforce is provided with a place in which to operate.

In my home state of Maine, we simply do not have the population density in any given area to support traditional science parks. However, Maine has been a national leader in providing business "incubation" services. Incubators are critical to the success of new companies. To help start-up entrepreneurial companies in Maine, centers around the state provide business support tailored to companies in their region. The benefit of business incubators in Maine has been nothing short of monumental, *with 87 percent of all businesses that graduate from incubators remaining in business.* The seven technology centers located throughout Maine have played a pivotal role in promoting technology-led economic development by advancing their own regional competitive advantages. Under the "Building a Stronger America Act," not only science parks, but also business incubators will be eligible for its vital assistance.

Residency in science parks provides businesses numerous advantages such as access to a range of management, marketing, and financial services. At its heart, a science park provides an organized link to local research centers or universities, providing resident companies with the constant access to the expertise, knowledge, and technology they need to grow. These innovation centers are specifically geared toward the needs of new and small companies, providing a controlled environment for the incubation of firms and the achievement of high growth.

It is also vital to point out that the jobs science parks create reflect the needs of a high-tech, innovative, and global marketplace. Science parks have helped lead the technological revolution *and have created more than 300,000 high-paying science and technology jobs, with another 450,000 indirect jobs for a total of 750,000 jobs in North America.*

Our Nation's capacity to innovate is a key reason why our economy continues to grow and remains the envy of the world. Through America's investments in science and technology, we continually change our country for the better. Ideas by innovative Americans in the private and public sector have paid enormous dividends, improving the lives of millions throughout the world. We must continue to encourage all avenues for advancing this vital sector if America is to compete at the forefront of innovation.

Thank you, Mr. Chairman.

Senator PRYOR. And for the witnesses, if you have materials or studies that you want to submit to make it part of the permanent record, we'd be delighted to accept that, as well.

I need to and I want to thank, Senator Kerry for agreeing to hold this hearing, and I'd like to especially thank him for allowing me to chair it. We have a great panel here, I know Senator Bingaman is very passionate about this, as well as a number of other Senators, we have several co-sponsors on our legislation that we'll be trying to push through the Senate some time in the near future.

In the last several years, the United States has undergone a dramatic transformation as the Nation moves to an economy driven by knowledge and technology. States and regions need an economic base composed of businesses that constantly innovate and maximize their use of technology in order to compete in this global economy.

It's generally acknowledged that several elements are required for a technology-based economy, such as an intellectual infrastructure, mechanisms for technology transfer, physical infrastructure, including high-quality Internet and telecommunications systems, and a skilled workforce.

Science parks are often recognized as the gold standard of technology-led economic development. Science parks are believed to enhance the synergy between universities and companies, and to promote the economic development and competitiveness of cities, states and regions, by providing a location in which researchers and companies can operate in close proximity.

Science parks can create an environment that fosters collaboration and innovation, leading to the commercialization of new ideas, products and technologies.

There's really no uniform definition for a science park. They're sometimes known as research parks or technology incubators. Regardless of what we call a science park, their principle goal is to facilitate the growth of innovation-based companies, by stimulating the flow of knowledge and technology among universities, research and development institutions, and businesses and markets.

Science parks accomplish this goal by providing infrastructure and support services, collaborative links with economic development agencies, academic institutions and research establishments, and essential business and technical support services needed by small and medium-sized companies.

Nearly half of science parks are university-affiliated, non-profit entities. Most of these parks were built in the 1980s and 1990s and have outgrown their original facilities.

Seventy-eight percent of science parks have expanded their physical presence after their creation. In the first decade of the 21st century, there has been a resurgence of interest in the development of science parks as an engine of innovation.

Earlier this year, I, along with others, introduced S. 1373, the Building a Stronger America Act, Senators Bingaman, Snowe and Smith were three of the co-sponsors.

The purpose of this bill is to promote investment in new and existing science parks throughout the United States. This bill would strengthen America's competitiveness by enhancing the science in-

frastructure that fosters new, innovative technologies, and speeds their entry into the global marketplace.

I look forward to hearing your testimony on how science parks contribute to U.S. competitiveness, and your suggestions for improving this important legislation.

Let me introduce the panel. What I'd like to do is ask each of you to do a five-minute opening statement. The order in which we'll do these would be Mike Bowman, Chairman and President, Delaware Technology Park, and incoming president, Association of University Research Parks, Phillip Stafford, who happens to be from Arkansas, University of Arkansas Technology Development Foundation, I want to give a special welcome to you, Phillip, and Randall Kempner, Vice President for Regional Innovation, Council on Competitiveness.

So, let's let everybody have 5 minutes to open. Again, I apologize, given the votes, we had to delay your openings for so long.

Mr. Bowman, why don't you lead off.

**STATEMENT OF J. MICHAEL BOWMAN, CHAIRMAN AND  
PRESIDENT, DELAWARE TECHNOLOGY PARK, INC.; INCOMING  
PRESIDENT, ASSOCIATION OF UNIVERSITY RESEARCH PARKS**

Mr. BOWMAN. Thank you, Senator Pryor.

I really deeply appreciate the opportunity to speak today on behalf of the Association of University Research Parks, which I assume you know.

What we do is foster the development of science and research parks, and enable innovation, commercialization and economic competitiveness.

AURP strongly supports S. 1373, and I'd like to explain why. The principal components of this are two-fold, as we understand it. The first being, it supports planning grants for new science parks, or expansions of existing ones. And second, it guarantees loans for credible, new, expanded or retrofitted building projects.

So, my message is really in three components, what are science parks today, what have they accomplished, and what is essential to keep the United States globally competitive.

As the bill states, science parks are really quite different than conventional business parks. Science parks are really focused on building communities and innovation. University, government and private sector come together within these parks as knowledge partners, and the purpose is really to connect ideas, talent and funding.

Science parks are usually recognized as the hub of an entrepreneurial ecosystem, and for its cutting-edge research. The characteristics of the occupants are, they're very interdisciplinary in their skill base, they're inter-institutional in the way they work together, and they also have cultures of both collaboration and competitiveness.

Science parks don't pick winners and losers—neither the technology, nor the business themselves. In fact, the best survive and thrive. The size and shape of research parks vary dramatically. You could have a 2, 3-acre postage stamp kind of facility in New York City with a million square feet going vertically, you could go to Research Triangle Park and find 7,000 acres in a campus-like environment, which is kind of a work, live, play community.

The common requirement of science parks is simply they be near the talent, and have rich intellectual property. And this would include faculty, grad students, interns, both academic and corporate spin-outs and global partnerships.

We're finding the growth of science parks accelerating. It's about 30 percent a year now, and many of the older parks are undergoing renewal. And that's because the rush of new technology. We're looking at translational biomedical research, nanotechnology, renewable energy—this is driving infrastructure change.

Today, we can count about 200 parks in North America, about 400 parks elsewhere in the world. The Battelle Technology Partnership Practice, in cooperation with AURP is about to release a comprehensive report on the characteristics and trends of research parks. But the early news on that is that we find that about 30,000 direct high-paying science and technology jobs associated with research parks, and another 450,000 indirect jobs. So, that's 750,000 new jobs in North America connected to this work. There are a lot of examples in the written testimony I've given about research parks.

My last point is simply this. While science parks differ in many ways, there is a unifying need for capital to build infrastructure, if the United States is to maintain a global economic leadership. Most other nations either subsidize, if not totally fund, infrastructure investments. And Senator Bingaman, earlier, related some of his trips to Asia. China considers science parks central to its university-based system, all the way through to commercialization. They have 50 parks up already, they have another 30 planned by 2010.

India, they've had a program since 1984 that's called the Science and Technology Entrepreneurs Park Program. That's generated a flurry of parks, particularly around information technology. And more recently, you've read about Singapore, focused on an entire city, a biomedical city called Biopolis that's already attracted over \$1 billion of investment.

So, most science parks in the U.S. are designed to be non-profit—they break even, at best, from operations. And what that means, they have no investment capability. They embrace higher risk innovation, they have earlier stage companies, and they take on non-profit research organizations. And, frankly, that's a tenant mix that has not been attractive for conventional funding without guarantees.

Furthermore, construction borrowing costs have increased dramatically over the last few years. Authorization of this bill, and appropriation of the requested funds would enable science parks to sustain our innovation edge, which is so critical to the U.S. economy. And, I think in many ways, this bill is a logical companion to the America COMPETES Act, which is really the stimulation of research and science education.

So, S. 1373 offers a solution to the where for science and technology, in order to move toward the market.

Thank you very much.

[The prepared statement of Mr. Bowman follows:]

PREPARED STATEMENT OF J. MICHAEL BOWMAN, CHAIRMAN AND PRESIDENT,  
DELAWARE TECHNOLOGY PARK INC.; INCOMING PRESIDENT, ASSOCIATION OF  
UNIVERSITY RESEARCH PARKS

Senator Pryor, Senator Carper, and Members of the Committee, thank you for the opportunity to testify here today in support of Senate Bill 1373, the “Building a Stronger America Act”.

My name is Michael Bowman. I am the Chairman and President of Delaware Technology Park, and the Incoming President of the Association of University Research Parks (AURP). I would like to provide my perspective to help you better understand science parks, and how they create economic development.

I also would like to thank you for the passage of the recent “America COMPETES” legislation. As you know, this important legislation calls for \$43 billion of new funding over the next three fiscal years to boost Federal investment in basic research in the physical sciences, expand math and science education programs at the K–12 and university levels, and revitalize policies that encourage innovation. It truly is an important element in maintaining America’s future competitiveness.

Today I’d like to discuss another important element. As the “America COMPETES” legislation provides research funding and education for our innovative knowledge workforce, that workforce will need places in which to work.

Science parks are those places.

### **Introduction**

The Association of University Research Parks (AURP) exists to foster the development of research and science parks. Science parks create innovation, commercialization and economic competitiveness through collaboration among universities, industry and government.

With membership consisting of planned and operating science parks in North America and across the globe, AURP’s mission is to educate the world about science parks, create networks to support them, and to promote their best practices.

AURP whole-heartedly supports Senate Bill 1373, otherwise known as the “Building a Stronger America Act”. As a means of fostering innovation and competitiveness, this act, if passed, would authorize the United States Department of Commerce to establish a \$7.5 million competitive grant planning program to enable winning localities to fund feasibility studies for developing regional science parks, or to expand and retrofit existing parks.

The legislation would also create a loan guarantee program to be applied to the development of new science parks, or to upgrade existing science park infrastructure. The bill calls for a loan guarantee for 80 percent of the face value of qualified construction loans, thereby increasing the ability of university science parks to make necessary investments in their infrastructure.

### **Science Parks as Economic Development Hubs**

The world’s first science park started in the early 1950s and foreshadowed the community known today as Silicon Valley. Another early science park set out to stop the “brain drain” from a rural, agricultural region, which was then dependent on the tobacco industry. Today Research Triangle Park, and the area around Raleigh and Durham, N.C., is home to many of the world’s most advanced high technology businesses. These businesses employ over 40,000 people.

Science parks provide the launch pad that startup companies need when they are “spun out” from a university or company. Park-provided training in such areas as intellectual property law and business planning help the fledgling businesses to succeed. Universities, in turn, benefit by exposure to the business world, and the connection to the cutting-edge research being conducted outside their walls in industry. What all science parks have in common is that they are, at heart, knowledge partnerships that foster innovation.

As science parks harness the combined power of education, research and private investment, the result is new jobs, new industries and solutions to age-old problems of mankind. They connect the innovative thinkers of our time and harness the most powerful resource of the 21st century: mind power.

Science parks are sources of entrepreneurship, talent, and economic competitiveness for our nation, and are key elements of the infrastructure supporting the growth of today’s global knowledge economy. By providing a location in which government, universities and private companies cooperate and collaborate, science parks create environments that foster collaboration and innovation. They enhance the development, transfer, and commercialization of technology.

More than 300,000 workers in North America work in university science parks. And according to the soon-to-be released AURP-Battelle Technology Practice report,<sup>1</sup> every job in a science park generates an average of an additional 2.57 jobs in the economy. Science parks are strong sources of entrepreneurship, talent, and economic competitiveness for our states and our Nation.

While parks vary widely in size and shape, from urban high-rises to suburban or rural locations, a typical American science park is located in a suburban community with a population of less than 500,000 and is operated by a university or a university-affiliated non-profit organization.

The companies in this typical science park are primarily private sector, but the science park is also home to university and government facilities. It is the combination of these three interacting elements: government, the university, and private sector companies—that gives parks their dynamism.

The typical park provides a range of business startup assistance to its client companies, which are often small startups based on innovative new ideas from university or private sector researchers. The park has an operating budget of less than \$1 million a year, and of course, since it is designed as a non-profit entity, the park itself does not generate significant net revenue. 750 people work at jobs there, primarily at information technology companies, pharmaceutical firms, or scientific and engineering service providers. These sorts of companies provide 45 percent of all science park jobs.

A new model—strategically planned mixed-use campus expansions—is emerging that involves shared space in which industry and academic researchers can work side by side. These university-affiliated mixed-use campus developments are not simply real-estate ventures. They embody a commitment by universities to partake in broader activities, offering companies high-value sites for accessing researchers, specialized facilities, and students, and promoting live-work-play environments. Key features of these mixed-use developments include space for significant future research growth; multi-tenant facilities to house researchers and companies; and housing, along with other amenities which are attractive to young faculty, post-doctoral and graduate students.

Centennial Campus at North Carolina State University is a case in point. In the 1980s, pressure for space at the main North Carolina State University (NCSU) campus in Raleigh led to exploration of nearby options, including substantial holdings by the state mental-health system and the Diocese of Raleigh on 1,000 acres surrounding the old Lake Raleigh Reservoir. Starting in the 1980s, the land was conveyed to NCSU in stages, and serious planning began with the appointment of a former dean of the university's School of Design to the position of campus coordinator.

At the outset, Centennial was conceived as a “smart growth” community that would incorporate a live-work environment and minimize the need for driving, through a connection to the main campus. The plan for Centennial evolved into a unique combination of institutional and commercial space side-by-side in a dual use “campus of the future.” The campus is divided into “neighborhoods” serving diverse high-tech sectors, each focusing on programmatic strengths of the university.

First to move was the College of Textiles, followed by the research components of the College of Engineering and units of other colleges. Then in 2002, some 200 additional acres already owned by the University and home to its College of Veterinary Medicine were renamed “Centennial Biomedical Campus” and will be developed using the Centennial Campus model, one that is being emulated throughout the world in new science park design.

Science parks are also being developed to leverage the assets of non-university research and development organizations such as Federal laboratories. In addition to universities, major medical research centers and other research organizations can be key drivers of technology-based economic development. It is becoming increasingly common for communities in which a Federal laboratory is located to create a science park to leverage laboratory resources to realize economic development.

Federal laboratories attract companies that wish to leverage the expertise of the laboratory researchers and to gain access to highly specialized, and often unique, facilities and equipment. Science parks can also provide a location for start-up companies created to commercialize technology developed in the labs.

Sandia Science and Technology Park, the National Aeronautics and Space Administration (NASA) Research Park at Ames, and the Tri-Cities Science and Technology Park located close to the Pacific Northwest National Laboratory are examples of re-

<sup>1</sup> *Characteristics and Trends in North American Research Parks: 21st Century Directions*, prepared by the Battelle Technology Partnership Practice in cooperation with the Association of University Research Parks, October 2007.

search parks that have been developed by or adjacent to Federal laboratories. Another example is the East Tennessee Technology Park at Oak Ridge National Laboratory.

Other outstanding examples of U.S. science parks are the Cummings Research Park in Huntsville, Alabama, and the Purdue Research Park in West Lafayette, Indiana. Begun in 1962, Cummings today is home to 285 companies which employ over 25,000 employees, and Purdue, founded in the late 1950s, is today home to over 90 companies.

Science parks are succeeding in incubating and growing companies. According to the Battelle report, nearly 800 firms graduated from park incubators in the past 5 years, while only thirteen percent failed. About one-quarter of these graduates remain in their park. Fewer than 10 percent of the graduates left the region.

And since science park jobs generate an additional 2.57 jobs, according to Battelle, the total employment impact of all science parks in the U.S. and Canada is more than 750,000 jobs.

Science parks are truly the hubs of our Nation's entrepreneurial ecosystem.

### **The Importance of Science Parks to America's Competitiveness**

All around the world, governments are turning to science park creation as a major economic development strategy. The vital role of maintaining the United State's economic competitiveness is particularly urgent as companies outsource jobs, manufacturing—and now, ever-increasingly, research and development—abroad. It is crucial to the U.S. economy that we also support our science parks if we are to continue to lead the world in scientific and technology development and maintain high-wage job growth.

Last year, the Chinese government announced plans to vastly increase annual funding of research and development, and determined that 60 percent of China's economic growth would be based on this sector by 2020.<sup>2</sup> At the same time, the government announced plans to build 30 new science and technology parks throughout the country, to be completed by 2010.<sup>3</sup> According to news bulletins, the parks are to be designed as incubators for small and medium-sized high-tech companies, many of which will be set up by universities or students.

Another threat to U.S. competitiveness comes from multinational corporations, which are increasingly shipping research and development abroad. A recent study by Jerry Thursby of Emory University and Marie Thursby of Georgia Institute of Technology,<sup>4</sup> which examined the future plans of top global corporations, found that over one-third of the companies interviewed anticipate a substantial change in the distribution of their research and development over the next 3 years. Nearly three-quarters of the companies that do anticipate a substantial change expect most of their technical employment growth during the next few years to be in China, while expecting U.S. technology staff to decline by nearly 4 percent during the same period.

Even more important to note is that the percentage of research conducted within corporations has dropped dramatically, shifting toward universities, which are often connected to science parks. Corporations commonly turn to science parks to spin out a product, which they then develop. Without the pathway of the science park, there is increasing danger that global corporations will turn to foreign science parks at this crucial stage.

Given the emphasis on intellectual property protection in the U.S., as well as the emphasis on collaboration between scientists, faculty and the private sector embodied in our own science parks, the United States can utilize its science parks to staunch the flow of the research and development off-shore, along with the ensuing brain drain, with proper funding and support.

Across North America, where capital funding has been provided for science park construction, dramatic results have been achieved. Canadian examples include University of Victoria's Vancouver Island Technology Park (VITP), which recently released an economic impact study showing that over \$280 million annually is generated from a capital investment of \$20 million. Other Canadian examples include Innovation Place in Saskatoon, Saskatchewan, where capital investments of \$160

<sup>2</sup> <http://www.scidev.net/News/index.cfm?fuseaction=readnews&itemid=2654&language=1>, accessed October 14, 2007.

<sup>3</sup> <http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2789&language=1>, accessed October 14, 2007.

<sup>4</sup> *Report to the Government-University-Industry Research Roundtable: Here or There? A Survey of Factors in Multinational R&D Location* by Jerry Thursby, Emory University and Marie Thursby, Georgia Institute of Technology and National Bureau of Economic Research, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine of the National Academies Press Washington, D.C., [www.nap.edu](http://www.nap.edu).

million over the last 27 years generate an annual impact on the local economy exceeding \$248 million per year, and Technoparc St-Laurent, Metropolitan Montreal, where capital investments over the last 10 years of \$100 million have generated additional new investments in excess of \$1.5 billion, with an impact on the Montreal economy exceeding \$250 million dollars annually.

Finally, it is well recognized that the U.S. has been lagging in science, math and technology education. As mentioned above, the “America COMPETES Act” addresses the urgent need to boost teaching of the sciences and technology for students starting in kindergarten and moving through high school into their college and post-graduate education.

The “Building a Strong America Act” is a logical companion to “America COMPETES Act” because science parks provide locations for university students and entrepreneurs, alike, to cross-fertilize ideas and conduct research that can be translated into new technologies. Thanks to science parks, ideas can become companies that grow, attract other companies, and eventually boost the economies of their states and the U.S. economy at large.

### **The Need for Funding and Loan Guarantees**

Senate Bill 1373 will foster U.S. competitiveness by supporting the development of new science parks throughout the country, both in rural and urban areas. It also establishes a mechanism for needed loan guarantees that will allow existing science parks to upgrade and retrofit their facilities.

Nascent science parks are urgently in need of both funding and government-backed loan guarantees. The same is true for more mature, existing science parks. Many date from the 1980s and 1990s and have out-grown their original facilities. Battelle indicates that three out of every four science parks have expansion plans that will require financing. However, securing financing is not a given for most parks, with their three elements—university, local government, and private sector interests.

The varying nature of specific scientific research dictates laboratory design and space requirements, so science parks can’t be created in a cookie-cutter fashion or replicated over and over. Each science park must be designed in a way specific to its own environment.

Add to this the fact that construction of science labs is an expensive endeavor, with flexibility needed so that laboratories can be changed frequently to meet the demands of cutting-edge research. For example, a lab built for chemistry may need to be retrofitted in the future for the study of nanotechnology. This upgrading of facilities to meet the needs of new technologies needs to be accomplished quickly, so that new industries and new jobs can be created here rather than abroad.

Since the companies in parks are usually startups with promising but uncertain futures, park facility construction is very difficult to fund in conventional ways. Private sector banks, which need collateral to back their loans, shy away from funding these sorts of facilities, due to their uncertainty.

The Delaware Technology Park is a case in point. Of the five buildings that comprise this very typical park, two were funded through bond issues that were backed by a long-term lease from an anchor tenant or the university. The three remaining buildings were privately financed through conventional bank loans.

Working with conventional banks proved to be a very difficult process at Delaware Technology Park. Despite a backlog of perspective companies and research entities, the guarantee of construction loans for new buildings was a major obstacle. It took 5 years to find an interim solution, but the issue persists today, impeding growth.

In fast-paced fields where new discoveries are taking place and entire new industries are being created—not to mention fierce market competition worldwide—it is clear the U.S. cannot rely on conventional means to back the growth and development of its science parks and innovation infrastructure.

Senate Bill 1373 creates a guarantee mechanism and dramatically unleashes the support these parks need. This bill would provide the U.S. with an enormous competitive boost at this critical juncture. Without the provisions noted in this bill, the United States stands to lose competitive positioning and will witness an increasing flight of its top scientists, technology experts and high-paying jobs overseas.

### **Conclusion**

As an important element of growing our Nation’s economy in today’s globally-competitive environment, science parks are where smart minds go to work. In these environments of innovation, startup businesses are provided the resources they need to flourish, forming new jobs and industries. More mature companies partner with universities on projects and find easy access to an educated workforce and suppliers.

As a means of creating sustainable prosperity for our country, science parks play a key role in maintaining America's competitiveness.

Science parks, however, face challenges. In today's uncertain financial climate, they must identify sources of support for both the development of new parks and the upgrading of existing parks if they are to help the U.S. remain competitive.

Science parks have the potential to translate discovery into application; develop talent; commercialize technology; and align government, higher-education, and private industry interests. They have the potential to be key elements in maintaining America's competitiveness.

Achieving this potential, however, will require enlisting leadership and support, accessing sufficient capital for park development, and recognizing the long-term nature of this endeavor. We ask for your support for S. 1373. Authorization of this bill and appropriation of the requested funds would enable science parks to help sustain the innovation edge so critical to the U.S. economy.

Thank you for taking the time to hold this hearing, for inviting me here today to participate, and for your continued interest and leadership on this crucial issue. I am pleased to answer any questions that you may have.

#### ATTACHMENT

##### **Facts about Science Parks and S. 1373—October 2007**

On Thursday, October 18, Senator Mark Pryor will conduct a Senate Commerce, Science, and Transportation Committee hearing to hear testimony regarding the "Building a Stronger America Act", S. 1373, supporting the development and infrastructure of science parks in the United States.

Science and research parks are located in nearly every state, with a sampling as follows:

- *Arkansas*: Arkansas Research and Technology Park, ASU (Planned).
- *Arizona*: ASU Research Park, University of Arizona Science and Tech Park.
- *California*: NASA Ames Research Park and numerous others.
- *Hawaii*: University of Hawaii at Hilo Research Park.
- *Massachusetts*: University Park at M.I.T. and numerous others.
- *Missouri*: Missouri Research Park; UMSL Business, Technology, Research Park.
- *Nevada*: Harry Reid UNLV Tech Park (planned).
- *North Dakota*: NDSU Research Tech Park and UND Tech Park.
- *Oregon*: Oregon State University at Corvallis (planned); Riverfront Research Park.
- *South Carolina*: Clemson ICAR, Innovista Research Campus (planned).
- *South Dakota*: SDSU Brookings Bioscience Park (planned).
- *Texas*: Texas Research Park at West San Antonio and numerous others.
- *Washington*: Tri-Cities Research Park; Research Park at WSU.
- *West Virginia*: University of West Virginia Research Park.

S. 1373 establishes a \$7.5 million competitive grant program for feasibility studies for science parks.

S. 1373 creates a loan guarantee program for development of new science parks, or retrofitting of existing science park infrastructure.

Science parks are the hubs of the United States entrepreneurial ecosystem.

According to the soon-to-be released Battelle Technology Partnership-AURP report, *21st Century Directions*, more than 300,000 workers in North America work in university research and science parks across North America.

Each core job in a science park generates an additional 2.57 jobs, according to the Battelle report.

Battelle estimates the total employment impact of all science parks across North America to be over 750,000 jobs.

The recent "America COMPETES Act" is the first part of the solution to the problem of maintaining U.S. competitiveness. It mandates research and education, and will create knowledge workers.

American knowledge workers need to have places in which to work. Science parks provide those places.

Across the world, governments in developing countries are utilizing a science park development policy to jump-start their economies. China recently announced plans for development of dozens of new science parks, in addition to the more than 50 they have already begun. India has had a science park program since 1984, and

they continue to construct new parks. Singapore is focused on a biomedical city called Biopolis, which has already attracted over \$1 billion in U.S. investment.

AURP, the Association of University Research Parks, strongly supports S. 1373.

Senator PRYOR. Thank you.

Next we'll have Mr. Stafford.

**STATEMENT OF PHILLIP S. STAFFORD, PRESIDENT,  
UNIVERSITY OF ARKANSAS TECHNOLOGY DEVELOPMENT  
FOUNDATION**

Mr. STAFFORD. Mr. Chairman, I am Phillip Stafford, President of the University of Arkansas Technology Development Foundation, a university-affiliated foundation charged with managing the Arkansas Research and Technology Park.

Thank you for allowing me to provide my remarks before the Subcommittee regarding the impact of research parks, and the recently introduced legislation, S. 1373, that you are sponsoring.

Thank you, Senator Pryor, for your steadfast support of the Arkansas Research and Technology Park, and University of Arkansas research programs, in general. We are extremely grateful.

The Arkansas Research and Technology Park is located in the City of Fayetteville, only 5 minutes from the main campus of the University. The collective research and development capacity of the ARTP assets currently stands at approximately 220,000 square feet, and is projected to grow to over 700,000 square feet at build-out.

A primary goal of the ARTP is to stimulate the formation of a collaborative community of companies linked interdependently with the University of Arkansas in research and development. Clustering innovative activities within broad areas of research will afford companies the benefits derived from collaboration, labor source pooling, and supplier networks.

Science, technology and innovation have taken center stage in efforts to boost economic growth, particularly in research parks throughout the Nation. Through the development of the ARTP, the University of Arkansas Technology Development Foundation, the City of Fayetteville, the state of Arkansas and the region are building an economic development engine focus on innovation and entrepreneurial strength that is able to attract and retain knowledge-based workers, and induce technology-based business cluster formation.

Because research parks provide the physical infrastructure and environment to encourage research and development, the ARTP is viewed as a cornerstone toward developing building blocks essential to growing and sustaining a knowledge-based economy in Arkansas, including access to capital, to promote new product development, spillovers of knowledge, capable of being translated into commercial innovation, intellectual property support to power the innovation cycle and sustain competitiveness, entrepreneurial culture, to spawn and nurture new company formation, and a technologically skilled workforce to support corporate growth.

It is clear that university-industry research collaboration is evolving into a highly sophisticated platform for innovation. At the ARTP, we are doing our part to lay a foundation that leads to sustained prosperity in Arkansas. More importantly, we are providing

our graduates high-paying professional career opportunities to enable them to build our future, our common future in Arkansas.

Assuring continued success of the ARTP and its affiliates, will require further development of multi-tenant research facilities and associated primary and secondary infrastructure to support growth and expansion to meet the research and development requirements of our emerging technology companies.

I am, therefore, encouraged that the legislation, S. 1373, that you are sponsoring, Senator Pryor, will provide grants and loan guarantees for the development and construction of science parks, to promote the clustering of innovation through high-technology activities.

Because university-related research parks typically involve small, emerging technology companies, credit enhancements are often necessary to achieve financing of project facilities. Consequently, this legislation addresses a problem that is universal to many research parks.

Moreover, I fully support the objectives of this legislation, because of the enormous value it will provide to our universities, our national economy and our Nation.

I would only add that the Committee may want to give consideration that a portion of these grants be directed to benefit areas and regions experiencing or threatened with substantial economic distress, as defined by the Economic Development Administration at the Department of Commerce, distress may exist in a variety of forms, including, but not limited to, high levels of unemployment, low income levels, or significant declines in per capita income.

Mr. Chairman, the Arkansas Research and Technology Park is already having a positive impact on the economy of Arkansas, and is contributing significantly to the development of the building blocks essential to grow and sustain a knowledge-based economy. I can only hope that more of these research parks will continue to play a significant role in the pace of innovation in our nation, accompanied by growth and expansion.

Sustaining this momentum is essential to nurture areas of collaborative activity, and to clusters of companies working in common areas of interest. Doing so will result in providing tangible benefits to the Nation, by attracting high-paying jobs, providing professional opportunities for high-technology workers, and forming clusters of expertise that are important to attracting additional high-technology firms.

Mr. Chairman, I thank you for allowing me to testify before your Committee today, it has been an honor to participate in this hearing.

And I'd be happy to answer any questions.

[The prepared statement of Mr. Stafford follows:]

PREPARED STATEMENT OF PHILLIP S. STAFFORD, PRESIDENT, UNIVERSITY OF  
ARKANSAS TECHNOLOGY DEVELOPMENT FOUNDATION

#### **Introduction**

Mr. Chairman and Members of the Committee, I am Phillip Stafford. I am the President of the University of Arkansas Technology Development Foundation, a university-affiliated foundation charged with the duty of managing the Arkansas Research and Technology Park at the University of Arkansas in Fayetteville. Thank you for allowing me to provide my remarks before the Subcommittee on Science,

Technology, and Innovation regarding the impact of research parks and the recently introduced legislation, S. 1373, sponsored by Senator Mark Pryor of Arkansas. Thank you, Senator Pryor, for your steadfast support for the Arkansas Research and Technology Park and the University of Arkansas research programs in general. We are extremely grateful.

### **Background**

Mr. Chairman, the Arkansas Research and Technology Park, is located in the City of Fayetteville, only 5 minutes from the heart of campus of the University of Arkansas. The Arkansas Research and Technology Park, also known as the ARTP, is currently home to the GENESIS Technology Incubator, the Innovation Center, the Engineering Research Center, the High Density Electronic Center and the National Center for Reliable Electric Power Transmission. The collective research and development capacity of the ARTP assets stands at approximately 220,000 square feet.

Since its inception, GENESIS has assisted a number of technology-based entrepreneurs in growing their firms to the point of economic viability. The incubator has an important role as the entry point to the ARTP for start-up companies that are working to develop emerging technologies in a variety of fields. Providing support to these young firms enables GENESIS to serve as a catalyst for increasing the number of knowledge-based jobs in northwest Arkansas and for improving the economic base of the region and the state.

The University of Arkansas Innovation Center, also located in the Arkansas Research and Technology Park south of the UA main campus, is adjacent to the award-winning GENESIS Technology Incubator and the Engineering Research Center, which houses 173,000 square feet of multidisciplinary laboratories and equipment, including the High Density Electronics Center. The Innovation Center provides office and laboratory space for technology-intensive private companies that want to locate at the ARTP in order to partner with the University in collaborative research, which drives innovation and enhances their competitive position. The Innovation Center has received a design award from the Arkansas Chapter of the American Institute of Architects and is recognized as the first LEED Certified building in the state of Arkansas, as designated by the U.S. Green Building Council.

Since assuming management in November of 2004, the UATDF has overseen a rapid transformation of the ARTP, signifying that the research park is playing an important role in catalyzing technology-based economic development. Over this period, public/private affiliates of the park have grown from 13 to 27 organizations paying an average annual salary of \$80,000. Presently, the Technology Development Foundation has approximately 40,000 square feet under lease to its 27 public/private affiliates. At full build out, the total R&D capacity of the ARTP is expected to grow to approximately 700,000 square feet.

A primary goal of the ARTP is to stimulate the formation of a collaborative community of companies linked interdependently with the University of Arkansas in research and development. Accordingly, the University has already identified several areas of innovation as the primary focus for partnerships, including:

- next-generation electronic and photonic devices,
- biotechnology and related chemical, biological and food sciences,
- materials and advanced manufacturing,
- database, software and telecommunications,
- environmental and ecosystem analysis,
- transportation and logistics.

Clustering innovative activities within these broad areas of research will afford companies the benefits derived from collaboration, labor-source pooling and supplier networks.

### **The Synergy Between University and City Entities**

Mr. Chairman, science, technology and innovation have taken center stage in efforts to boost economic growth, particularly at places like research parks throughout the Nation. According to new data compiled by the Association of University Research Parks (AURP), research parks in the United States, like the Arkansas Research and Technology Park, and in Canada directly employ more than 350,000 people and contribute more than \$31 billion annually to the economy in the United States and Canada.

Through the development of the Arkansas Research and Technology Park, the University of Arkansas Technology Development Foundation, the City of Fayetteville, the state of Arkansas, and region are building an economic development engine focused on innovation and northwest Arkansas entrepreneurial strength that

is able to attract and retain knowledge-based workers and induce technology-based business cluster formation. Because research parks provide the physical infrastructure and environment to encourage research and development, the ARTP is viewed as the cornerstone toward developing the building blocks essential to growing and sustaining a knowledge-based economy in Arkansas.

The City of Fayetteville, Arkansas has been an extraordinary partner in the development of the ARTP by providing the necessary resources to assist the Technology Development Foundation. Not only has the city provided financial support for the planning and conceptual engineering for the ARTP, but it is currently designing the reconstruction of Cato Springs Road to serve as the Technology Corridor linking the ARTP and other privately held R&D companies to the University of Arkansas main campus.

### **Why Companies Locate to Science Parks**

True progress toward a knowledge-based economy in Arkansas and throughout the Nation will require that select individuals and organizations commit to early-stage investment in emerging technology companies to enable these companies to bridge the gap between product development and commercialization. The Technology Development Foundation has been active at the Arkansas Research and Technology Park in establishing and cultivating ties to organizations like the Arkansas Venture Forum, Accelerate Arkansas, Innovation to Return on Investment and the Fund for Arkansas' Future to facilitate access to financial capital for its corporate partners.

Aside from the physical infrastructure supporting research and development, the Technology Development Foundation is leveraging spillovers of knowledge from the University and translating this knowledge into industrial innovation in the form of new companies concentrating in the areas of nanoscience, food safety, cell biology and detection and diagnosis of various diseases. Moreover, to assure that promising innovations find their way into the commercial mainstream, the University of Arkansas Technology Development Foundation has implemented an intellectual property support system to assess, package and license new technologies to power the innovation cycle and sustain the competitiveness of its corporate partners.

The ARTP continues to spawn and nurture a growing entrepreneurial culture through the GENESIS Technology Incubator and the Innovation Center. Since January 2005, affiliates of GENESIS and the Innovation Center have accounted for approximately \$36 million in Small Business Innovation Research grants and contracts. Not only does this Federal program provide critical seed funding to ARTP companies, it serves to validate that the technologies under development are commercially important.

Through its corporate partners, ARTP is also contributing to the development of a technologically skilled workforce. The ARTP now provides direct employment for 215 highly trained knowledge-based workers, many of whom are graduates of the University of Arkansas. It is further estimated that another 107 jobs have been created within the region in indirect support of ARTP research and development. Moreover, it is projected that the ARTP will contribute to the creation of 2,000 jobs at build out.

In addition, the Technology Development Foundation is developing a vital network of contacts in the entrepreneurial, finance, and professional service communities to sustain the growth of its corporate partners. In Fiscal Year 2008, the Technology Development Foundation will work closely with the organization selected to implement the new Innovate Arkansas initiative, designed to provide high-growth companies services to enhance their business plans and provide access to potential early stage investors. Innovate Arkansas will also provide other valuable services that can enhance the growth and development of emerging technology companies.

It is clear that university/industry research collaboration is evolving into a highly sophisticated platform for innovation. Why is this important? First, it makes good economic sense. Through collaboration that leads to innovation, we can start and grow new firms that augment the economic ecosystem, giving rise to new technology clusters that build on the base of technological expertise in place in northwest Arkansas. Second, it's good policy because university/industry research provides opportunities for students to make the connection between knowledge gained in the classroom and its application in business and industry. At the ARTP, we are doing our part to lay a foundation that leads to sustained prosperity in Arkansas. More importantly, we are providing our graduates high-paying professional career opportunities to enable them to build their future—our common future—in Arkansas.

**S. 1373—Science Parks Legislation**

As a result of the success of the ARTP affiliate companies, both the Innovation Center and the GENESIS Technology Incubator are operating at full capacity. Assuring continued success of the Tech Park and its affiliates will require further development of multi-tenant research facilities and associated primary and secondary infrastructure to support growth and expansion of the ARTP to meet the research and development requirements of our emerging technology companies.

I am, therefore, encouraged that the legislation, S. 1373, sponsored by Senator Mark Pryor will provide grants and loan guarantees for the development and construction of science parks to promote the clustering of innovation through high technology activities. Because university-related research parks typically involve small emerging technology companies, credit enhancements are often necessary to achieve financing of project facilities. Consequently, this legislation addresses a problem that is universal to many research parks.

The purposes outlined in S. 1373 are essential to support existing research parks in their activities to acquire more space and infrastructure to accommodate technology activities and encourage the inclusion of more companies to promote further economic growth. Moreover, it is also essential to provide planning support to those areas with major research universities to conduct feasibility studies for science parks among various geographic areas.

As one who has watched on the front lines the development of the Arkansas Research and Technology Park, I fully support the objectives of this legislation because of the enormous value it will provide to our universities, our national economy and our Nation.

I would only add that the Committee may want to give consideration that a portion of these grants be directed to benefit areas and regions experiencing or threatened with substantial economic distress. As defined by the Economic Development Administration at the Department of Commerce, distress may exist in a variety of forms, including, but not limited to, the following:

- high levels of unemployment,
- low income levels,
- large concentrations of low-income families,
- significant declines in per capita income,
- substantial loss of population because of the lack of employment opportunities,
- large numbers (or high rates) of business failures,
- sudden major layoffs or plant closures,
- trade impacts,
- military base closures,
- natural or other major disasters,
- depletion of natural resources,
- or reduced tax bases.

**Conclusion**

Mr. Chairman, the Arkansas Research and Technology Park is already having a positive impact on the economy of Arkansas and is contributing significantly to the development of the building blocks essential to growing and sustaining a knowledge-based economy. I can only hope that more of these research parks will continue to play a significant role in the pace of innovation in our nation, accompanied by growth and expansion.

Sustaining this momentum is essential to nurture areas of collaborative activity into clusters of companies working in a common area of interest. Doing so will result in providing tangible benefits to the Nation by attracting high paying jobs, providing professional opportunities for high technology workers, and forming clusters of expertise that are important for attracting additional high technology firms.

Mr. Chairman, thank you for allowing me to testify before your Committee today. It has been an honor to participate in this hearing. I am happy to answer any questions that you may have. Thank you.

Senator PRYOR. Thank you.  
Mr. Kempner?

**STATEMENT OF RANDALL T. KEMPNER, VICE PRESIDENT,  
REGIONAL INNOVATION, COUNCIL ON COMPETITIVENESS**

Mr. KEMPNER. Thank you, Mr. Chairman. It is a pleasure for me to be here today, thank you for the opportunity to present to you and to the Committee. I am the Vice President of Regional Innovation at the Council on Competitiveness, a non-partisan, non-governmental policy organization that's based here in Washington.

As an organization, we are committed to ensuring the future prosperity of all Americans for enhanced competitiveness in global markets.

The theme of my testimony this afternoon on regional competitiveness and the role of science parks within that, has been a major focus of the Council for nearly a decade. Starting in the 1990s with our pioneering work with Professor Michael Porter at Harvard on regional clusters of innovation, the Council has been focused on understanding what elements drive national and regional prosperity.

We've worked closely with the Economic Development Administration, the Employment and Training Administration, and dozens of economic and workforce development organizations across the country to implement policies and programs that support regional innovation-based development.

We're also pleased to have been one of the groups through our National Innovation Initiative that shaped and supported the America COMPETES Act, and we congratulate you and your fellow Senators on its passage.

Let me begin my remarks on the science parks with my conclusion: science parks can be a very important asset in promoting regional competitiveness, but parks by themselves are no guarantee of regional success. For science parks to succeed in promoting regional economic growth, they must be fully integrated into the overall regional economic development strategy, and we believe that any Federal program to support parks, should incorporate criteria that promote alignment with other regional assets and development efforts.

Allow me to briefly discuss key elements of regional prosperity, and where science parks fit in. Today, in the United States, regional prosperity, and indeed, the prosperity of our country, depends upon our people, and—the ability of our people and our institutions to innovate. We can no longer compete, based on simple manufactured products, or on commodities, indeed, today we compete most successfully on the commercialization of high-value products and services that command a premium on the world market. To do this, we need to innovate, and we need to do it well, and we need to do it quickly.

To meet this challenge, regional leaders, then, need to create an environment that supports innovative workers, and innovative firms. To do this, there are really three high-level factors that are critical for any regional developer to think about. The three are innovation assets, innovation networks and the underlying business culture.

So, assets in this model include the human, intellectual, financial, physical, and institutional capital located in the region. These get at many of the sorts of things that site selection consultants and corporate expansion makers think about typically, like the

availability of skilled labor, the quality of transportation infrastructure, cost of doing business, rather, tax and regulatory environment, and science parks and business incubators are an example of this kind of economic asset. However, like all assets, their value depends on how well they're utilized.

This brings us to the second factor, which is networks. Assets must be linked to support regional innovation. Unfortunately, all too often, we see that innovative ideas and people remain unconnected, because formal and informal networks don't exist within regions. As we found in our *Regional Innovation: National Prosperity* report, many ideas generated by university researchers, while valuable from a purely intellectual standpoint, don't reach their full economic potential, because they're not translated into new products or services.

On the other hand, when you find regions that do support a web of linked idea generators, managers and capital, they're much more likely to become what we call innovation hotspots.

The third of the issues that can stop a region from becoming a hotspot is the business culture. It's critical in business culture to have one which supports business leaders who are willing and interested in cooperating and sharing information, even when they compete in some circumstances.

In addition, regional attitudes toward risk-taking comprise a critical issue, or critical area for thinking about the business culture. If innovation and entrepreneurship is to take hold, risk-taking must be appreciated and celebrated, even if it often leads to failures. Failure for the right reasons should be embraced, and people who fail for right reasons should not be ridden out of town, but should be celebrated.

A final cultural characteristic of note is appreciation of people who have diverse experiences and backgrounds. Since innovators, by their very nature, often act and think outside of the norm, regions where residents respect and can handle distinct backgrounds and distinct viewpoints have an easier time in cultivating innovators.

So, supporting regional innovation is a dynamic and complex endeavor, and science parks can play a very important role. Parks can offer specialized infrastructure that is critical for the work of targeting industry clusters, they can provide low-cost space that supports creative interaction and offers training and mentorship programs to help entrepreneurs launch businesses, they can serve the critical function of linking science to entrepreneurs, capital providers and managers. But they can also be islands.

It's critical that they try to actually not be islands, they need to not, like underused bridges or poorly-constructed water mains, become costly infrastructure projects. The key is science parks delinked from other regional innovation assets will be destined to under perform.

So, the success is to ensure that they are developed in the context of an overall regional economic development strategy, and connected to other regional assets. They should be active nodes in a highly networked environment, not isolated islands.

As you mentioned, Senator Pryor, science parks are frequently recognized as the gold-standard of technology-led economic develop-

ment, and they often are. But, they have to be deeply connected with all of the other elements that are required for regional prosperity.

Thanks very much for the opportunity to present, and I look forward to your questions.

[The prepared statement of Mr. Kempner follows:]

PREPARED STATEMENT OF RANDALL T. KEMPNER, VICE PRESIDENT, REGIONAL  
INNOVATION, COUNCIL ON COMPETITIVENESS

Chairman Kerry, Ranking Member Ensign, Senator Pryor and Members of the Subcommittee, thank you for the opportunity to testify on science parks and their impact on U.S. competitiveness.

As the Vice President for Regional Innovation, I am here on behalf of the Council on Competitiveness' 150 corporate CEOs, university presidents and labor leaders committed to ensuring the future prosperity of all Americans through enhanced competitiveness in the global economy. The Council is a non-partisan, non-governmental organization based in Washington, D.C. that fervently believes that the best way to drive prosperity is for America to have the world's most productive workers and competitive firms so that we can succeed in the global marketplace.

This hearing comes at an opportune time as science parks are becoming increasingly important to our knowledge-based economy. As the Council's *Competitiveness Index* report found, American job growth will come primarily from small and medium sized businesses, science parks will play a critical role in accelerating entrepreneurship and innovation. The Congress, through the America COMPETES ACT, has already taken an important step in ensuring America's long term competitiveness. The Council's private sector, university, and labor leadership was actively involved in shaping and supporting the legislation through our National Innovation Initiative and we congratulate this committee and the Senate on its passage.

The theme of my testimony this afternoon—regional competitiveness, and the role of science parks in supporting regional growth—has been a major focus of the Council for nearly a decade. Starting in the late 1990s with our pioneering work with former Council Chair and Bell South CEO Duane Ackerman and Professor Michael Porter on regional clusters of innovation and extending through our recent National Innovation Initiative effort, the Council has focused on understanding what elements contribute to U.S. regional success in a the global knowledge economy. Our president, Deborah Wince-Smith, served as the Chair of Commerce Secretary Gutierrez's Strengthening America's Communities Initiative (SACI) Advisory Committee. In addition, we have worked closely with the Economic Development Administration at the Department of Commerce, the Employment and Training Administration at the Department of Labor, and dozens of economic and workforce development organizations across the country to catalyze and help implement programs that support, regional, innovation-based development.

As the work of the SACI Committee and the Council's National Innovation Initiative found, science and research parks can be a highly valuable asset in promoting national and regional competitiveness. However, parks by themselves are no guarantee of regional success. For science parks to succeed in promoting regional economic growth, they must be fully integrated into the overall regional economic development strategy. We believe that any Federal program to support parks should incorporate criteria that promote alignment with other regional assets and development efforts.

Allow me to briefly discuss the key elements of regional innovation-based development and the role of science parks therein. Today, in the United States, regional prosperity depends upon the ability of its people and institutions to innovate and the development of regional ecosystems that support high value economic activity. In this country, it is increasingly difficult to compete based on low-cost commodity products or the production of standardized manufactured goods. Instead, we compete most successfully on the commercialization of high-value products and services that command a premium on the world market. This requires fast and effective innovation and deployment in global markets. To meet this challenge, regional leaders must work to create an environment that supports innovative workers and firms.

Regional innovation capacity rests on more than just scientific discovery or idea generation—it is the output of a dynamic interplay of a variety of regional factors. There are three high-level factors that are at play within every region: *Innovation Assets, Networks, and Culture*.

*Assets* in the innovation-based economic development model include the human, intellectual, financial, physical, and institutional capital located in a region. The asset base incorporates many common criteria for corporate expansion decisions, such as: availability of skilled labor, the quality of transportation infrastructure, cost of doing business, proximity to customers, the tax and regulatory environment and quality of life. Assets also include many other factors that are not as widely considered but are equally important to innovation, such as: research and development investment, risk capital firms, technology commercialization, and programs that catalyze entrepreneurship and small business growth. Science parks and business incubators are an example of an economic asset that can support regional innovation. However, like all assets, their value depends on how they are used. This brings us to the second key factor: networks.

Assets must be linked to support regional innovation. All too often, however, innovative ideas and people remain unconnected because *formal and informal networks* do not exist. As we found in the Council's *Regional Innovation: National Prosperity* report, many ideas generated by university researchers, while valuable from a purely intellectual standpoint, do not reach their full economic potential because they are not translated into new products or services. Similarly, many promising entrepreneurs never get the chance to succeed because local capital providers are unaware of the investment opportunity. On the other hand, regions that do support a web of linked idea generators, managers, and capital, are more likely to become, what the Council calls innovation "hot spots."

However, we find that many U.S. regions lack a *business culture* that supports collaboration and other pro-innovation attitudes. One key aspect of a regional business culture is the degree to which business leaders are willing to cooperate and share ideas even when they compete in some circumstances. The whole concept of cluster-based economic development is that firms will thrive if they operate in an environment in which they leverage shared knowledge, while developing their own unique strategies.

Regional attitudes toward risk-taking comprise another key area. If innovation and entrepreneurship is to take hold, risk-taking must be appreciated and celebrated, even if it often leads to failure. Failure must be understood as a component of the creative process. And those who fail for the right reasons should be embraced, not ridden out of town.

A final cultural characteristic of note is appreciation of people who have diverse experiences and backgrounds. An increasing body of scholarly work suggests that regions which are inclusive and embrace people of all sorts may be better suited for supporting innovation than those that do not. Regions which support a wide variety of artistic expression, in music, physical arts, and the humanities are more attractive to the creative class. Since innovators, by their very nature, often act and think outside the norm, regions where residents respect and embrace diversity may have an easier time cultivating innovators.

Supporting regional innovation is a dynamic and complex endeavor. And science parks can play a very important role in mix. Parks can offer general support services and specialized infrastructure that is critical to the work of targeted industry clusters—like wet labs for life sciences companies or clean rooms for work in optics research. They can provide low cost space that supports creative interaction and offer training and mentorship programs to help entrepreneurs launch their businesses. They can serve the critical function of linking scientists, entrepreneurs, capital providers, and managers—and become a network of networks for the region. Through awards, public events, and successful incubation of firms, they can help build an entrepreneurial culture that values risk-taking and collaboration.

Successful research parks like the Delaware Technology Park that my colleague and fellow panelist Michael Bowman runs, and parks associated with our national labs at Sandia and Los Alamos, offer most of these services and have become truly integrated into the regional economies.

But parks can also be islands. Sometimes science parks become hermetically sealed locations that operate with an inward-focus and have little relevance to the local economy. Like underused bridges or poorly constructed water mains, they can become a costly infrastructure project with a poor return on investment. Science parks de-linked from other regional innovation assets are destined to underperform.

The key to success for parks is to ensure they are developed in the context of an overall regional economic development strategy and connected to other regional assets. They should be active nodes in a highly networked environment, not isolated islands. As a recent report by the State Science and Technology Institute argues, "*An incubator should be created only if a clear need, a sufficient market, and adequate resources to support the incubator have first been identified.*"

Therefore, if Congress were to offer special financial support for sciences parks, it should ensure that every successful recipient has demonstrated their clear relevance to existing regional development strategies, their specific plans for linking to regional institutions—not just the university to which the park may be affiliated, and their strategy for obtaining funding that would sustain park growth after Federal support is exhausted. Rather than measuring solely the number of jobs created or firms incubated, the park should be judged on the quality, or wage levels the new jobs provide, and the actual operational success of firms that graduate from the park.

As you mentioned Mr. Chairman, “science parks are often recognized as the gold standard of technology-led economic development.” And they can be—but not without making sure they are deeply connected with all the other elements that are required for regional prosperity.

Thank you again for the opportunity to present to this hearing. I look forward to your questions.

Senator PRYOR. Well, thank all of you, again, for being here.

Let me go ahead and start, if I may, with you, Mr. Kempner, just general big-picture questions to start with. All of the witnesses have talked about science parks contributing to economic development, and helping cities, states, regions, but have we been able to measure that? Are there studies out there? Can you see the statistics being able to measure what’s going on out there?

Mr. KEMPNER. There are statistics, and there are studies that have been done, although I think in our opinion they’re still inconclusive.

What’s clear is that there are many science parks that have incredibly positive economic impacts in terms of the jobs that they create, as well as the money that they generate for the various regional entities in which they operate.

At the same time there are also examples of science parks that have not been successful, and that are operating as islands, that don’t create the level of support, and the level of business activity that we would hope to see. And that’s why we think it’s so important, that as you think about how you support the parks, you make sure that there are criteria in the selection process that make sure you’re getting a park which isn’t going to be an island, but is one that is going to network very well with the region around it.

Senator PRYOR. OK. Also, big picture. You, generally, and I understand what you’re saying, that it depends on the nature of the park, and the nature of the area they’re in, et cetera, but generally are science parks accomplishing the stated goal of bringing entrepreneurs and investors together to start-up companies?

Mr. KEMPNER. Yes, I think that they are. And certainly the ones that are successful, recognize that their efforts need to take place as much outside of the park as inside of the park. And I think you would find in the parks of my colleagues at the table, that they recognize fully that it’s all about making those connections. It’s not just about doing the research, it’s about making sure that research becomes linked to financiers, to managers, so that the great ideas that come from universities and researchers actually get commercialized.

Senator PRYOR. My perception is that most, not all, but most of the jobs in a science park are high-tech jobs. Am I right on that?

Mr. KEMPNER. That tends to be the case, yes sir.

Senator PRYOR. And you mentioned this concept of integration into the regional economy. If the science park is not integrated into

its environment, so to speak, then it may not succeed or it may not be as successful as it otherwise would be. What are the other cautions you would have, things that we need to look for, be careful of? You've given some in your testimony. Would you like to add anything to that?

Mr. KEMPNER. Well, one thing I would say, is that it's important when you think about evaluating the science park, that from an economic development perspective, there are some evaluation metrics, which may not be the same as those you would look at from a technology perspective. And so, you should, as the bill suggests, care about the number of jobs that are created. But it's equally important to look at the quality of those jobs, to make sure they're high-paying, high-tech jobs.

Another thing that's important, is actually to look at the economic activity that's being generated by those firms and how many, not just get started, but how many succeed, and how many jobs those firms create, and what kind of economic activity that they have. I think there's a risk sometimes that science parks, again as I said before, think about them as sort of their own hermetically sealed unit. And I just would suggest that it's important to make sure, as again, I think my colleagues understand, that any park that gets funded is one that's clearly looking and is trying to do a lot of external relations with the regional assets that exist.

Senator PRYOR. And the last question I had, at least for the moment for you is, your two co-panelists are both on university campuses or near university campuses and closely tied with universities. How important of a factor is it to be either tied with or at least be near a university or some sort of Federal laboratory?

Mr. KEMPNER. Well, what's critical is that you need to have access to really smart people. And Federal labs and universities are really good sources of really smart people. There are other sources out there, but I can't think of any that are better than universities or Federal labs. And so, if you have that linkage, it makes the process easier, because you have access both to the Ph.D. researchers, as well as the grad students or technicians that are so critical in the research endeavor. And then hopefully, you also have access to the people with the business expertise that will be necessary to take those ideas and turn them into real products and services.

Senator PRYOR. Great.

Let me ask you, Mr. Bowman, with regard to S. 1373?

Mr. BOWMAN. Yes.

Senator PRYOR. In your existing facilities now in Delaware—

Mr. BOWMAN. Yes.

Senator PRYOR.—will that bill, in your view, help your park or potentially help your park, or do you see this bill as more for start-ups?

Mr. BOWMAN. Oh, it would absolutely help our park.

Senator PRYOR. In what ways?

Mr. BOWMAN. Let me explain. We have five buildings in our park. We've done two of them with bond issues. In order to get a bond issue, essentially you have to have a very long-term lease commitment of somebody, an anchor. That's not a start-up situation.

The other three buildings we did, it took us 5 years to find very complicated financing in order to handle a very large growing backlog of start-up companies and non-profit research institutes. The net result of that was, we were kind of in slow gear until we finally figured that out. We had to find an equity partner, which was difficult. Guaranteed financing, which could go behind a bond, would be a very big deal and that would be a wonderful thing for us to do for our next building.

Senator PRYOR. Actually, I was going to ask Mr. Stafford the same type of question on financing. Both Delaware and Arkansas have, at least for Arkansas, large parts of the State that are very rural, several areas not as rural as they used to be. It's grown quite a bit. Mr. Stafford, at your facility in Arkansas, how did you piece together the financing. I've been there several times, but I don't remember exactly when it started. And, I know it's, what, 10 years old. I'm not quite sure. But, how did you piece together the financing there?

Mr. STAFFORD. Well, it was largely with the cooperation of the University of Arkansas. In its earliest stages the, what we recognize today as the Arkansas Research and Technology Park, was something referred to as the Engineering Research Center. And they put a Genesis Technology Incubator in the Engineering Research Center and that incubator reported up through the College of Engineering, just like other departments would.

The University of Arkansas bought an old pantyhose factory, quite frankly, and has, over the years, renovated that facility to incredible multi-disciplinary laboratories that serve as important research infrastructure to our tenants and the research park.

Beyond the Engineering Research Center, the High Density Electronic Center, the National Center for Reliable Electric Power Transmission, those research resources are in the research park. The University of Arkansas also did the taxable bond issue to build the Innovation Center, where we could continue to move beyond nurturing true startup companies, but have a place for the more mature companies to locate and continue to benefit from the relationship, the partnership, if you will, that they have formed with the University of Arkansas.

So, most recently, we were fortunate enough to have support, and you played a large role in that, to help us with appropriations to do some infrastructure development and continue to build those essential ports of access, if you will, to the research park. But it's, bootstrapping was the primary way that we were able to create the necessary facilities that you see in the research park today.

Senator PRYOR. If you can, give the Committee a sense of the diversity of types of companies that have started there and how they're progressing.

Mr. STAFFORD. We have chosen to focus on what we feel are the core research strengths of the University of Arkansas. So we have companies working in the area of next generation of electronic photonic devices. We have companies that we have started in the area of biotechnology, as it relates to the chemical, biological, and food sciences. The medical campus is in Little Rock, and so our, we don't concentrate in the life sciences so much, but do have a robust group of biotechnology companies in the park now.

Transportation and logistics is another important area of concentration at the University, and as a logical consequence, we've seen companies growing out of that. Advanced materials and manufacturing, we've got three truly world-class nanotechnology companies in the research park. And with the new initiative that is being inspired by Wal-Mart, we think that environmental sciences or clean technologies are soon to become another area of intense focus for the University and we look forward to leveraging that as well.

Senator PRYOR. You know, one of the things that has impressed me at your facility was, for example, in nanotechnology, the people in the park are not just committed to the research and the development, but they're actually committed to manufacturing to get products out in the marketplace, whatever they are.

When I've been there, I've heard positive feedback on the collaborative nature of the science park or technology park. Because, you have a lot of disciplines around and just given the environment there, how beneficial is it to have everybody together with so many different specialties going on at the same time?

Mr. STAFFORD. Well, I believe it's critical. We have, the Technology Development Foundation has a partnership developer that works with each of the affiliates in the park to make sure that, first of all, they're vertically integrated with the University of Arkansas, so that they are receiving, depending on what their needs are, we facilitate access to people, to faculty, to students, but more importantly, we facilitate access to facilities and equipment. So, making sure that they're vertically integrated with the University is how we add value to their business proposition. But then we also work to assure that they are horizontally integrated with one another. And as a result of that, we are trying to drive this whole concept of cluster development.

And we are seeing, right now, an emerging cluster, if you will, in the area of high-temperature, high-voltage electronics, and the new National Center for Reliable Electric Power Transmission is only going to add to that. It's—it's going to be a world-class, soon to become an international asset toward electric reliability, but it is a user facility that our young startup companies in the area of high-temperature, high-voltage electronics can utilize to further advance their technologies as well.

Senator PRYOR. And give the Committee a sense of about how many companies you have out there and about how many employees there are?

Mr. STAFFORD. We have 27 public/private affiliates in the research park. We have another three startup companies that we have housed on our main campus, only because we lack facilities to house them at the research and technology park. So a total of 30 public/private affiliates of the research park. And the direct employment stands at 215. Anecdotally, you would expect that there's another 107 indirect jobs, in support of the research and development activities at the research park.

Senator PRYOR. Mr. Kempner, let me ask, there has been a national story that's been unfolding over the last several weeks, about the sub-prime mortgage markets and the problems that's causing

in the credit world. But, do you have any concern that science parks would be at risk of defaulting on these guaranteed loans?

Mr. KEMPNER. Senator, I am not a financial expert, but based on what I know of science parks, they would be less likely to default under these sorts of circumstances.

Senator PRYOR. Why do you say that?

Mr. KEMPNER. Because typically, they are related to universities, who hopefully have bonding capacity and the assets in order to support this. That said, I would suggest that there may be other experts who could give you—and I'm happy to get the information for you on that question.

Senator PRYOR. Mr. Bowman, I think it was in your statement. You talked about a success story in China?

Mr. BOWMAN. I talked about how China is certainly all over research parks and have 50 on the ground and 30 more coming, yes.

Senator PRYOR. What we do in this country, is it different than what they do in Asia?

Mr. BOWMAN. It is. I think what Mr. Kempner said earlier is very appropriate. And that is, it's not who can spend the most that's going to win. We can spend a lot, but they're going ahead, they are spending a lot. They're building cities.

Their model today has a lot of import talent connected to it. If you go back to the day of Mao driving everybody out, they're in the second generation of trying to bring them back. If we're not careful about the visa issues and some other things, which have allowed us to educate and retain enormous talent from around the world, including China. That's one of our edges. I think the other edge we have is a natural innovative, creative history. It's in the fabric of our country, our people. It's not so much the case in China.

And so, you know, I was actually recruited to consider going to Hong Kong and taking over their operation. And I'm thinking, "Why would they want someone from the U.S. to do that?" And basically, the answer was, they have difficulty trying to connect the leadership of the various points of the economy, that is the university, the government, and the private sector, in a way that actually moves things forward beyond just the walls. It's Randall's point about reaching in to the community and creating something. It's not in their history to have done that. It's more speculation driven.

And I think the U.S. success in innovation is because of that collaborative leadership, the right kind of leadership stepping up and the access to the talent. And it starts with great science, great scientists. If we don't have that, these parks don't mean a lot. They are just real estate places.

Senator PRYOR. Let me ask everybody about venture capital and how successful these parks are in accessing venture capital, how that works, and why venture capitalists might be attracted to these science parks? Who wants to take that first?

Mr. STAFFORD. I'd be happy to.

There's—there are two parts, probably, to that story. And in our case, the University of Arkansas, at the Arkansas Research and Technology Park, we're at a very young developing stage and we have a number of young developing companies. And it's particularly difficult to attract venture capital at the very earliest stages, only because they want to see a robust revenue picture on those

companies before they will entertain or engage with the company to provide the equity capital.

On the other hand, the research parks can be a driver. One of the other demands, if you will, that venture capitalists have, is that there needs to be deal flow. And so, a research park can be extremely important in assuring that the deal flow is there, which provides the impetus, quite frankly, for the venture capital to follow on. So, we're—we're working very diligently to create that venture capital at all stages and levels, at the seed level, angel level. There is an institutional fund now, a fund of funds, in Arkansas, that is giving rise to a growing venture capital community.

But it's essential to growing those companies and assuring that those products do make it to market. It's what takes them over that, gets them to that next level.

Mr. BOWMAN. If I could add to that. I think, you know, it's a layered kind of thing. So, you start with the seed angel stuff. And so, you've got to have a fairly interested, high net-worth group of people to do that round. As you go further up the ladder, at the actual venture company, venture capitalists, they do tend to be near where their companies are. And that's why you find so many in Silicon Valley and Boston. They've done a fantastic job. It's a critical mass, it's a patience kind of thing.

But as you move along, I think the parks responsibility is to try to foster that. And we've done a couple things. We've recently formed an organization called First State Innovation. It's all about the angel innovation money. And we've done a number of deals recently, bootstrapped them from individuals, which then takes you to the venture capital market. We've taken it to the next level, we put on two events, one called Bio-Life Tech coming up, and one called Early Stage East. These are venture capital fairs. The Mid-Atlantic is able to draw several hundred investors into that climate and we vet 20, 30 companies to present at the A round, if you will. Once it gets beyond that, I think the venture community will take care of itself.

The sad thing today is, the bar for venture capital is very high. There's plenty of money out there, it's just the bar to get it is very high. And so, as Mr. Stafford says, you've got to have real proof of, more than just proof of concept. You've got to have real proof of a business with clients and customers for them to get involved.

Senator PRYOR. Did you want to add?

Mr. KEMPNER. I'd just add briefly that, if you look at venture capital funding across the country, about two-thirds of it is in four regions; LA/San Diego, Silicon Valley, Boston area, and New York area. If you're not in one of those four, having a science park, which is connected to the local financial community and connected to the national financial community, is one of your best options if you want to try to bring venture capitalists. It becomes a target-rich environment and they need that if they're going to move out of their basic hubs.

Senator PRYOR. Yes, I suspect that's Delaware's thinking. And I know that Arkansas went through that process as well. As you know, up here in Washington, a lot times when we're trying to get R&D dollars out into the country, they just tend to collect in some of those areas that you're talking about. There are others too, it de-

depends on what you're talking about, but it tends to collect in areas with high-powered traditional research institutions. It's hard, oftentimes, for smaller states, sort of newer players in the research field to have access to that.

So, part of what we're trying to do with this legislation is to make sure that other people get a bite of the apple, if they can put it together there in their communities and their states.

I'm about done with my questions and I know that some of my colleagues want to submit some in writing. And I want to thank you all. But before I close, is there any last word that any or all of you all would like to say. I really appreciate you all coming and I appreciate you all looking at our legislation. We're going to continue to try to move this forward. We're glad you're doing what you do. Does anybody have anything that, either we missed or something that just needs to be said?

Mr. BOWMAN. We stand ready to do whatever it takes, Senator Pryor, to help you get this thing through. It's very important to us.

Senator PRYOR. Well, thank you.

Mr. STAFFORD. We appreciate your leadership on this, Senator Pryor. We are presently looking at another building in our research park and we are struggling with that whole financing picture. And this legislation would make our effort ever so much more possible. So, we look forward to its passage.

Thank you so much.

Mr. KEMPNER. I just commend you on looking in general issues that relate to innovation-based economic development and am happy to be helpful going forward to you and your staff as you actually put this bill together. Thanks for the chance to be here.

Senator PRYOR. You bet. Thank you for being here.

Thank you for your time, and again, I'm sorry for the big hole in the schedule. But, I want to, again, let everybody know that we're going to leave the record open for 2 weeks. So, if anybody wants to submit more questions, that's great. And if you all have exhibits, studies, background material, whatever it may be, we'd be glad to include that as well.

Well with that, I want to thank the panel for being here. I appreciate the discussions. It's helpful, it's insightful, and hopefully it will help us do some good things here in Washington to help this country spur some economic development all around the country. So, with that, we'll adjourn the meeting and thank you very much.

[Whereupon, at 4:42 p.m., the hearing was adjourned.]